```
=> d his
        (FILE 'USPAT' ENTERED AT 09:57:57 ON 21 MAR 96)
L1              0 HYBRIDWARE AND SERVER
L2              0 HYBRIDWARE
L3            491 BROADCAST AND FULL-DUPLEX
L4             23 L3 AND NETWORK AND MANAGER AND ROUTER AND CHANNEL AND REMO
TE
=> d l4 1-23
```

1. 5,392,278, Feb. 21, 1995, Distributed multisite system architecture;
James L. Teel, et al., 370/58.3, 85.7, 95.1 [IMAGE AVAILABLE]

2. 5,384,776, Jan. 24, 1995, Audio routing within trunked radio
frequency multisite switch; Philip Gulliford, et al., 370/85.1, 95.3
[IMAGE AVAILABLE]

3. 5,379,337, Jan. 3, 1995, Method and system for providing emergency
call service; Michael J. Castillo, et al., 379/45, 49 [IMAGE AVAILABLE]

4. 5,367,643, Nov. 22, 1994, Generic high bandwidth adapter having data
packet memory configured in three level hierarchy for temporary storage
of variable length data packets; Paul Chang, et al., 395/309; 364/927.92,
927.93, 927.96, 940, 940.61, DIG.2; 370/60, 85.13, 85.14, 94.1, 94.2;
395/800 [IMAGE AVAILABLE]

5. 5,323,444, Jun. 21, 1994, Emergency call system with call
capacity/last chance routing feature; Douglas J. Ertz, et al., 379/45,
49, 142, 212, 265 [IMAGE AVAILABLE]

6. 5,313,454, May 17, 1994, Congestion control for cell networks; Lionel
A. Bustini, et al., 370/13, 60, 60.1, 68.1, 84, 94.1, 94.2 [IMAGE
AVAILABLE]

7. 5,287,354, Feb. 15, 1994, Data protocol and monitoring system for RF
trunking multisite switch global serial **channel**; James L. Teel, Jr.,
et al., 370/85.7, 85.11, 85.9 [IMAGE AVAILABLE]

8. 5,241,537, Aug. 31, 1993, Conventional base station interface
architecture for RF trunking multisite switch; Philip C. Gulliford, et
al., 370/67, 110.2 [IMAGE AVAILABLE]

9. 5,200,954, Apr. 6, 1993, Communication link between multisite RF
trunked **network** and an intelligent dispatcher console; James L. Teel,
Jr., et al., 370/94.1, 99; 455/33.1 [IMAGE AVAILABLE]

10. 4,977,582, Dec. 11, 1990, Synchronization of non-continuous digital
bit streams; Robert K. Nichols, et al., 375/371; 370/108 [IMAGE
AVAILABLE]

11. 4,958,341, Sep. 18, 1990, Integrated packetized voice and data
switching system; Jayant G. Hemmady, et al., 370/60.1 [IMAGE AVAILABLE]

12. 4,942,574, Jul. 17, 1990, Concurrent resource request resolution
mechanism; Bruce R. Zelle, 370/85.15; 340/825.5; 370/85.6 [IMAGE
AVAILABLE]

13. 4,922,486, May 1, 1990, User to **network** interface protocol for
packet communications networks; William P. Lidinsky, et al., 370/60;

340/825.34; 370/94.1 [IMAGE AVAILABLE]

14. 4,899,333, Feb. 6, 1990, Architecture of the control of a high performance packet switching distribution **network**; Gary A. Roediger, 370/60, 94.1 [IMAGE AVAILABLE]

15. 4,897,874, Jan. 30, 1990, Metropolitan area **network** arrangement for serving virtual data networks; William P. Lidinsky, et al., 380/3; 340/825.31, 825.34; 370/60, 94.1; 380/25 [IMAGE AVAILABLE]

16. 4,896,319, Jan. 23, 1990, Identification and authentication of end user systems for packet communications **network** services; William P. Lidinsky, et al., 370/60; 340/825.34; 370/94.1 [IMAGE AVAILABLE]

17. 4,894,824, Jan. 16, 1990, Control **network** for a rapid connection circuit switch; Jayant G. Hemmady, et al., 370/58.3 [IMAGE AVAILABLE]

18. 4,893,302, Jan. 9, 1990, Arrangement for switching concentrated telecommunications packet traffic; Jayant G. Hemmady, et al., 370/60 [IMAGE AVAILABLE]

19. 4,875,206, Oct. 17, 1989, High bandwidth interleaved buffer memory and control; Robert K. Nichols, et al., 370/85.15; 340/825.05; 370/60 [IMAGE AVAILABLE]

20. 4,872,160, Oct. 3, 1989, Integrated packetized voice and data switching system; Jayant G. Hemmady, et al., 370/60 [IMAGE AVAILABLE]

21. 4,872,159, Oct. 3, 1989, Packet **network** architecture for providing rapid response time; Jayant G. Hemmady, et al., 370/60, 61, 85.6, 94.1 [IMAGE AVAILABLE]

22. 4,872,158, Oct. 3, 1989, Distributed control rapid connection circuit switch; Gaylord W. Richards, 370/58.1 [IMAGE AVAILABLE]

23. 4,872,157, Oct. 3, 1989, Architecture and organization of a high performance metropolitan area telecommunications packet **network**; Jayant G. Hemmady, et al., 370/60, 58.1 [IMAGE AVAILABLE]
=> d l4 ab 1-23

ABSTRACT:
A multisite **network** switch for a series of RF digital trunked radio transceivers and dispatcher consoles. Each transceiver covers a certain site area. The switch establishes audio communications between different sites and various dispatcher consoles. The multisite switch has a distributed architecture in which each node of the switch is supported by a microprocessor controlled card. Each node interfaces with a site, dispatcher console, system **manager** or other system component.

ABSTRACT:
A distributed trunked radio frequency (RF) switching **network** (switch) distributes audio routing control and processing throughout the switch, thus avoiding a centralized mixing matrix, increasing fault tolerance and providing low routing request latency time. Each audio source (e.g., RF

repeater transmitter, dispatch console microphone) is preassigned an
audio **channel** on a time division multiplexed (TDM) digitized audio
network or bus. The audio sources continually **broadcast** digitized
audio signals to all other nodes over the TDM **network**. Audio routing
is performed at the audio destinations (e.g., nodes associated with RF
repeater receivers, dispatch console speakers) by selectively "listening"
to active TDM **network** channels. In the preferred embodiment, audio is
routed unidirectionally on an "as needed" basis (e.g., in response to
radio transceiver "keys" and "unkeys"), and audio routing pathways may
change dynamically during an on-going call.

ABSTRACT:
An emergency call routing system includes a platform having a call
router and a processor for identifying destinations to which such
router directs emergency calls. The processor receives administration
commands from administrators, some of which are at a public safety
answering point (PSAP) to which the **router** directs calls for handling
and redirection to emergency service providers (ESPs). Some of such
administration commands relate to defining intervals during which a
particular PSAP is, according to an administered night service schedule,
to be inactive with respect to handling emergency calls. Other of such
commands relate to administrative operations to place such PSAPs into
such inactive state earlier than the schedule. Others of such commands
relate to administrative directions to withdraw such PSAP from such
inactive state before the scheduled time. Interfaces between
attendants/administrators and workstations used with such processor are
provided to facilitate ease of administering such schedule and those
overrides.

ABSTRACT:
A generic high bandwidth adapter providing a unified architecture for
data communications between buses, channels, processors, switch fabrics
and/or communication networks. Data is carried by data stream packets of
variable lengths, and each packet includes a header control information
portion required by communication protocols used to mediate the
information exchange, and normally a data portion for the data which is
to be communicated. The generic high bandwidth adapter comprises a
processor subsystem including a processor for processing the header
control information portions of data packets. The processor has access to
data packets stored in a packet memory which stores data packets arriving
at four generic adapter input/output ports. The packet memory is
segmented into a plurality of buffers, and each data packet is stored in
one or more buffers as required by the length thereof. A generic adapter
manager is provided for performing and synchronizing generic adapter
management functions, including implementing data structures in the
packet memory by organizing data packets in buffers, and organizing data
packets into queues for processing by the processor subsystem or transfer
to or from generic adapter input/output ports. Each generic adapter
input/output port has associated therewith a packet memory interface
providing for the transfer of data packets into and out of the packet
memory, such that when a data packet is received at an input/output port,
the data packet is transferred into the adapter packet memory and queued
for processing.

ABSTRACT:
A community emergency response service system is provided with three types of destinations to which emergency calls may be routed. These include public safety answering points (PSAPs), switch directory numbers and public switching telephone **network** directory numbers. A last chance routing system is effective upon failure of the system to route an incoming one of such emergency calls to one of such three types of destinations. The last chance routing facility performs a linear search of all PSAPs within such system to determine whether any of such PSAPs has been inspected for availability to handle such emergency call. When such linear search identifies a PSAP which has not previously been inspected with respect to its availability to handle such emergency call, a determination is made as to whether such PSAP is currently available. Such determination includes determining whether such PSAP is currently at its call capacity. That call capacity is determined based upon a call capacity depth established for each workstation at such answering point. The call capacity limit is obtained by multiplying such call capacity depth times the current number of workstations that are active at such PSAP.

ABSTRACT:
A feedback control system for congestion prevention in a cell (packet) switching communication **network** is described. Congestion control is accomplished by controlling the transmission rate of bursty traffic in the presence of high priority, voice, low speed statistical, high speed deterministic and multicast data. Because bursty traffic is relatively insensitive to delay, adequate buffer capacity can be provided at the **network** nodes in order to minimize bursty data cell loss. By monitoring the buffer queue lengths at the nodes, a control signal can be generated at each intermediate node indicating the state of congestion. Excess queue length indicates incipient congestion while short queue lengths indicate excess capacity. Queue status is forwarded to the destination node where it is interpreted and sent back to the source node as a feedback rate control signal using a 2-bit code. The source node regulates the rate of bursty data transmission over the cell **network** in accordance with the feedback control signal thus minimizing congestion and concomitant data loss while efficiently utilizing available **network** bandwidth.

ABSTRACT:
A multisite **network** switch for a series of RF digital trunked radio transceivers and dispatcher consoles. Each transceiver covers a certain site area. The switch establishes audio communications between different sites and various dispatcher consoles. The multisite switch has a distributed architecture in which each node of the switch is supported by a microprocessor controlled card. The nodes are connected by audio buses and a dedicated message bus. The messages on the message bus allow the nodes to communicate control information regarding the status of slots on the audio bus, the members in groups, the location of radio units, call types and a host of other information needed to operate the switch.

ABSTRACT:
An interface for a conventional base station into a digitally trunked
network of RF communications systems acts a pseudo-down link from a
multisite switch to a trunked site controller. The interface monitors the
conventional channels from the base station and sends a **channel**
assignment message to the multisite switch when it detects a voice
signal. The **channel** assignment message notifies the trunked RF
systems that a new call is active so that each system can assign a
trunked working **channel** to the conventional call. Similarly, the
multisite switch sends a **channel** request when a trunked call is to be
broadcast over a conventional **channel**. The interface keys the
channel and couples the **channel** to the trunked call.

US PAT NO: 5,200,954 [IMAGE AVAILABLE]   L4: 9 of 23

ABSTRACT:
A communication link for a dispatcher console to a multisite **network**
of RF digitally trunked radio site transceivers and other dispatcher
consoles. The communication link provides the dispatcher console direct
access to a wide area RF **network**. A multisite central switch
establishes audio and control communications between the different sites
and various dispatcher consoles. The dispatcher consoles have audio and
control links to the multisite switch. The multisite switch has a
distributed architecture in which a switch node interfaces with the
dispatcher console. A control communication protocol provides a standard
format for message packets between the multisite switch and dispatcher
console.

US PAT NO: 4,977,582 [IMAGE AVAILABLE]   L4: 10 of 23

ABSTRACT:
A high capacity metroplita, area **network** (MAN) is described. Data
traffic from users is connected to data concentrators at the edge of the
network, and is transmitted over fiber optic data links to a hub
where the data is switched. The hub includes a plurality of data
switching modules, each having a control means, and each connected to a
distributed control space division switch. Advantageously, the data
switching modules, whose inputs are connected to the concentrators,
perform all checking and routing functions, while the 1024x1024 maximum
size space division switch, whose outputs are connected to the
concentrators, provides a large fan-out distribution **network** for
reaching many concentrators from each data switching module. Distributed
control of the space division switch permits several million connection
and disconnection actions to be performed each second, while the
pipelined and parallel operation within the control means permits each of
the 256 switching modules to process at least 50,000 transactions per
second. The data switching modules chain groups of incoming packets
destined for a common outlet of the space division switch so that only
one connection in that switch is required for transmitting each group of
chained packets from a data switching module to a concentrator. Data
streams from different inputs of the space division switch to a
concentrator are synchronized to a clock by a circuit that detects the
delay between a clock transition and an initial data signal transition
and by a circuit for delaying the signal from the space division switch
in accordance with the detected delay.

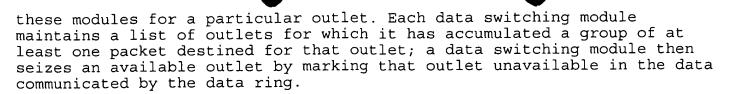US PAT NO: 4,958,341 [IMAGE AVAILABLE]   L4: 11 of 23

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data
traffic from users is connected to data concentrators at the edge of the
network, and is tranmitted over fiber optic data links to a hub where
the data is switched. The hub includes a plurality of data switching
modules, each having a control means, and each connected to a distributed
control space division switch. Advantageously, the data switching
modules, whose inputs are connected to the concentrators, perform all
checking and routing functions, while the 1024.times.1024 maximum size
space division switch, whose outputs are connected to the concentrators,
provides a large fan-out distribution **network** for reaching many
concentrators from each data switching module. Distributed control of the
space division switch permits several million connection and
disconnection actions to be performed each second, while the pipelined
and parallel operation within the control means permits each of the 256
switching modules to process at least 50,000 transactions per second. The
data switching modules chain groups of incoming packets destined for a
common outlet of the space division switch so that only one connection in
that switch is required for transmitting each group of chained packets
from a data switching module to a concentrator. MAN provides security
features including a port identification supplied by the data
concentrators, and a check that each packet is from an authorized source
user, transmitting on a port associated with that user, to an authorized
desination user that is in the same group (virtual **network**) as the
source user.
This arrangement can also be used to switch voice packets, using a voice
interface such as a digital switch and a digital voice signal to voice
packet converter. In accordance with one embodiment of the invention, a
packet switch is used for switching voice packet outputs of the data
switching modules and a circuit switch, such as the space division
switch, is used for switching data packet outputs.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data
traffic from users is connected to data concentrators at the edge of the
network, and is transmitted over fiber optic data links to a hub
where the data is switched. The hub includes a plurality of data
switching modules, each having a control means, and each connected to a
distributed control space division switch. Advantageously, the data
switching modules, whose inputs are connected to the concentrators,
perform all checking and routing functions, while the 1024.times.1024
maximum size space division switch, whose outputs are connected to the
concentrators, provides a large fan-out distribution **network** for
reaching many concentrators from each data switching module. The data
switching modules chain groups of incoming packets destined for a common
outlet of the space division switch so that only one connection in that
switch is required for transmitting each group of chained packets from a
data switching module to a concentrator. MAN provides security features
including a port identification supplied by the data concentrators, and a
check that each packet is from an authorized source user, transmitting on
a port associated with that user, to an authorized destination user that
is in the same group (virtual **network**) as the source user.
In accordance with one enbodiment of the invention, a data ring
communicates space division switch outlet availability to each of the
data switching modules in turn, in order to resolve the contention among

these modules for a particular outlet. Each data switching module
maintains a list of outlets for which it has accumulated a group of at
least one packet destined for that outlet; a data switching module then
seizes an available outlet by marking that outlet unavailable in the data
communicated by the data ring.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data
traffic from users is connected to data concentrators at the edge of the
network, and is transmitted over fiber optic data links to a hub
where the data is switched. The hub includes a plurality of data
switching modules, each having a control means, and each connected to a
distributed control space division switch. Advantageously, the data
switching modules, whose inputs are connected to the concentrators,
perform all checking and routing functions, while the 1024.times.1024
maaximum size space division switch, whose outputs are connected to the
concentrators, provides a large fan-out distribution **network** for
reaching many concentrators from each data switching module. Distributed
control of the space division switch permits several million connection
and disconnection actions to be performed each second, while the
pipelined and parallel operation within the control means permits each of
the 256 switching modules to process at least 50,000 transactions per
second. The data switching modules chain groups of incoming packets
destined for a common outlet of the space division switch so that only
one connection in that switch is required for transmitting each group of
chained packets from a data switching module to a concentrator. MAN
provides security features including a port identification supplied by
the data concentrators, and a check that each packet is from an
authorized source user, transmitting on a port associated with that user,
to an authorized destination user that is in the same group (virtual
network) as the source user. A special **network** protocol for
implementing these features is controlled by data in the header of
packets for the **network**.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data
traffic from users is connected to data concentrators at the edge of the
network, and is transmitted over fiber optic data links to a hub
where the data is switched. The hub includes a plurality of data
switching modules, each having a control means, and each connected to a
distributed control space division switch. Advantageously, the data
switching modules, whose inputs are connected to the concentrators,
perform all checking and routing functions, while the 1024.times.1024
maximum size space division switch, whose outputs are connected to the
concentrators, provides a large fan-out distribution **network** for
reaching many concentrators from each data switching module. Distributed
control of the space division switch permits several million connection
and disconnection actions to be performed each second, while the
pipelined and parallel operation within the control means permits each of
the 256 switching modules to process at least 50,000 transactions per
second. The data switching modules chain groups of incoming packets
destined for a common outlet of the space division switch so that only
one connection in that switch is required for transmitting each group of
chained packets from a data switching module to a concentrator. MAN

provides security features including a port identification supplied by
the data concentrators, and a check that each packet is from an
authorized source user, transmitting on a port associated with that user,
to an authorized destination user that is in the same group (virtual
network) as the source user.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data
traffic from users is connected to data concentrators at the edge of the
network, and is transmitted over fiber optic data links to a hub
where the data is switched. The hub includes a plurality of data
switching modules, each having a control means, and each connected to a
distributed control space division switch. Advantageously, the data
switching modules, whose inputs are connected to the concentrators,
perform all checking and routing functions, while the 1024.times.1024
maximum size space division switch, whose outputs are connected to the
concentrators, provides a large fan-out distribution **network** for
reaching many concentrators from each data switching module. Distributed
control of the space division switch permits several million connection
and disconnection actions to be performed each second, while the
pipelined and parallel operation within the control means permits each of
the 256 switching modules to process at least 50,000 transactions per
second. The data switching modules chain groups of incoming packets
destined for a common outlet of the space division switch so that only
one connection in that switch is required for transmitting each group of
chained packets from a data switching module to a concentrator. MAN
provides security features including a port identification supplied by
the data concentrators, and a check that each packet is from an
authorized source user, transmitting on a port associated with that user,
to an authorized destination user that is in the same group (virtual
network) as the source user.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data
traffic from users is connected to data concentrators at the edge of the
network, and is transmitted over fiber optic data links to a hub
where the data is switched. The hub includes a plurality of data
switching modules, each having a control means, and each connected to a
distributed control space division switch. Advantageously, the data
switching modules, whose inputs are connected to the concentrators,
perform all checking and routing functions, while the 1024.times.1024
maximum size space division switch, whose outputs are connected to the
concentrators, provides a large fan-out distribution **network** for
reaching many concentrators from each data switching module. Distributed
control of the space division switch permits several million connection
and disconnection actions to be performed each second, while the
pipelined and parallel operation within the control means permits each of
the 256 switching modules to process at least 50,000 transactions per
second. The data switching modules chain groups of incoming packets
destined for a common outlet of the space division switch so that only
one connection in that switch is required for transmitting each group of
chained packets from a data switching module to a concentrator. MAN
provides security features including a port identification supplied by
the data concentrators, and a check that each packet is from an

authorized source user, transmitting on a port associated with that user, to an authorized destination user that is in the same group (virtual **network**) as the source user.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data traffic from users is connected to data concentrators at the edge of the **network**, and is transmitted over fiber optic data links to a hub where the data is switched. The hub includes a plurality of data switching modules, each having a control means, and each connected to a distributed control space division switch. Advantageously, the data switching modules, whose inputs are connected to the concentrators, perform all checking and routing functions, while the 1024.times.1024 maximum size space division switch, whose outputs are connected to the concentrators, provides a large fan-out distribution **network** for reaching many concentrators from each data switching module. Distributed control of the space division switch permits several million connection and disconnection actions to be performed each second, while the pipelined and parallel operation within the control means permits each of the 256 switching modules to process at least 50,000 transactions per second. The data switching modules chain groups of incoming packets destined for a common outlet of the space division switch so that only one connection in that switch is required for transmitting each group of chained packets from a data switching module to a concentrator. MAN provides security features including a port identification supplied by the data concentrators, and a check that each packet is from an authorized source user, transmitting on a port associated with that user, to an authorized destination user that is in the same group (virtual **network**) as the source user. Distributed control of the space division switch is implemented by dividing that switch into disjoint sets of connection and switching elements and controlling each such set with a different controller. These controllers communicate via a separate control **network** with the data switching modules which request circuit connections.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data traffic from users is connected to data concentrators at the edge of the **network**, and is transmitted over fiber optic data links to a hub where the data is switched. The hub includes a plurality of data switching modules, each having a control means, and each connected to a distributed control space division switch. Advantageously, the data switching modules, whose inputs are connected to the concentrators, perform all checking and routing functions, while the 1024.times.1024 maximum size space division switch, whose outputs are connected to the concentrators, provides a large fan-out distribution **network** for reaching many concentrators from each data switching module. Distributed control of the space division switch permits several million connection and disconnection actions to be performed each second, while the pipelined and parallel operation within the control means permits each of the 256 switching modules to process at least 50,000 transactions per second. The data switching modules chain groups of incoming packets destined for a common outlet of the space division switch so that only one connection in that switch is required for transmitting each group of

chained packets from a data switching module to a concentrator. MAN
provides security features including a port identification supplied by
the data concentrators, and a check that each packet is from an
authorized source user, transmitting on a port associated with that user,
to an authorized destination user that is in the same group (virtual
network) as the source user. The data switching modules each use a
synchronous data ring for transporting data packets between data link
handlers and a plurality of memory access controllers and their
associated memory modules.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data
traffic from users is connected to data concentrators at the edge of the
network, and is transmitted over fiber optic data links to a hub
where the data is switched. The hub includes a plurality of data
switching modules, each having a control means, and each connected to a
distributed control space division switch. Advantageously, the data
switching modules, whose inputs are connected to the concentrators,
perform all checking and routing functions, while the 1024.times.1024
maximum size space division switch, whose outputs are connected to the
concentrators, provides a large fan-out distribution **network** for
reaching many concentrators from each data switching module. Distributed
control of the space division switch permits several million connection
and disconnection actions to be performed each second, while the
pipelined and parallel operation within the control means permits each of
the 256 switching modules to process at least 50,000 transactions per
second. The data switching modules chain groups of incoming packets
destined for a common outlet of the space division switch so that only
one connection in that switch is required for transmitting each group of
chained packets from a data switching module to a concentrator. MAN
provides security features including a port identification supplied by
the data concentrators, and a check that each packet is from an
authorized source user, transmitting on a port associated with that user,
to an authorized destination user that is in the same group (virtual
network) as the source user. The data switching modules each use a
synchronous data ring for transporting data packets between data link
handlers and a plurality of memory access controllers and their
associated memory modules.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data
traffic from users is connected to data concentrators at the edge of the
network, and is transmitted over fiber optic data links to a hub
where the data is switched. The hub includes a plurality of data
switching modules, each having a control means, and each connected to a
distributed control space divisison switch. Advantageously, the data
switching modules, whose inputs are connected to the concentrators,
perform all checking and routing functions, while the 1024.times.1024
maximum size space division switch, whose outputs are connected to the
concentrators, provides a large fan-out distribution **network** for
reaching many concentrators from each data switching module. Distributed
control of the space division switch permits several million connection
and disconnection actions to be performed each second, while the
pipelined and parallel operation within the control means permits each of

```
1128093  LOWER
      7  SPREED

      0  LOWER SPREED
            (LOWER(W)SPREED)
  97793  UPSTREAM
      0  (LOWER SPREED)(P)UPSTREAM
      0  (BROADCAST(P)DOWNSTREAM) AND  ((LOWER SPREED)(P)UPSTREAM)
```
L5
=>

the 256 switching modules to process at least 50,000 transactions per second. The data switching modules chain groups of incoming packets destined for a common outlet of the space division switch so that only one connection in that switch is required for transmitting each group of chained packets from a data switching module to a concentrator. MAN provides security features including a port identification supplied by the data concentrators, and a check that each packet is from an authorized source user, transmitting on a port associated with that user, to an authorized destination user that is in the same group (virtual **network**) as the source user.

This arrangement can also be used to switch voice packets, using a voice interface such as a digital switch and a digital voice signal to voice packet converter. In accordance with one embodiment of the invention, a packet switch is used for switching voice packet outputs of the data switching modules and a circuit switch, such as the space division switch, is used for switching data packet outputs. In accordance with another embodiment, voice packets are switched from the data switching modules through the space division switch to a small group of data switching modules, which further switch the voice packets through the circuit switch to a destination concentrator.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data traffic from users is connected to data concentrators at the edge of the **network**, and is transmitted over fiber optic data links to a hub where the data is switched. The hub includes a plurality of data switching modules, each having a control means, and each connected to a distributed control space division switch. Advantageously, the data switching modules, whose inputs are connected to the concentrators, perform all checking and routing functions, while the 1024.times.1024 maximum size space division switch, whose outputs are connected to the concentrators, provides a large fan-out distribution **network** for reaching many concentrators from each data switching module. Distributed control of the space division permits several million connection and disconnection actions to be performed each second, while the pipelined and parallel operation within the control means permits each of the 256 switching modules to process at least 50,000 transactions per second. The data switching modules chain groups of incoming packets destined for a common outlet of the space division switch so that only one connection in that switch is required for transmitting each group of chained packets from a data switching module to a concentrator. MAN provides security features including a port identification supplied by the data concentrators, and a check that each packet is from an authorized source user, transmitting on a port associated with that user, to an authorized destination use that is in the same group (virtual **network**) as the source user. Each packet has an associated high or low priority indication. Requests for connections in the space division switch for a chained group of packets whose first packet has a high priority indication are given priority.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data traffic from users is connected to data concentrators at the edge of the **network**, and is transmitted over fiber optic data links to a hub

where the data is switched. The hub includes a plurality of data switching modules, each having a control means, and each connected to a distributed control space division switch. Advantageously, the data switching modules, whose inputs are connected to the concentrators, perform all checking and routing functions, while the 1024.times.1024 maximum size space division switch, whose outputs are connected to the concentrators, provides a large fan-out distribution **network** for reaching many concentrators from each data switching module. Distributed control of the space division switch permits several million connection and disconnection actions to be performed each second, while the pipelined and parallel operation within the control means permits each of the 256 switching modules to process at least 50,000 transactions per second. The data switching modules chain groups of incoming packets destined for a common outlet of the space division switch so that only one connection in that switch is required for transmitting each group of chained packets from a data switching module to a concentrator. MAN provides security features including a port identification supplied by the data concentrators, and a check that each packet is from an authorized source user, transmitting on a port associated with that user, to an authorized destination user that is in the same group (virtual **network**) as the source user. Distributed control of the space division switch is implemented by dividing that switch into disjoint sets of connection and switching elements and controlling each such set with a different controller. These controllers communicate via a separate control **network** with the data switching modules which request circuit connections.

ABSTRACT:
A high capacity metropolitan area **network** (MAN) is described. Data traffic from users is connected to data concentrators at the edge of the **network**, and is transmitted over fiber optic data links to a hub where the data is switched. The hub includes a plurality of data switching modules, each having a control means, and each connected to a distributed control space division switch. Advantageously, the data switching modules, whose inputs are connected to the concentrators, perform all checking and routing functions, while the 1024.times.1024 maximum size space division switch, whose outputs are connected to the concentrators, provides a large fan-out distribution **network** for reaching many concentrators from each data switching module. Distributed control of the space division switch permits several million connection and disconnection actions to be performed each second, while the pipelined and parallel operation within the control means permits each of the 256 switching modules to process at least 50,000 transactions per second. The data switching modules chain groups of incoming packets destined for a common outlet of the space division switch so that only one connection in that switch is required for transmitting each group of chained packets from a data switching module to a concentrator. MAN provides security features including a port identification supplied by the data concentrators, and a check that each packet is from an authorized source user, transmitting on a port associated with that user, to an authorized destination user that is in the same group (virtual **network**) as the source user.
=> (broadcast(p)downstream) and ((lower spreed)(p)upstream)
            13925 BROADCAST
          124992 DOWNSTREAM
            167 BROADCAST(P)DOWNSTREAM